S05P1581

FIG. 1

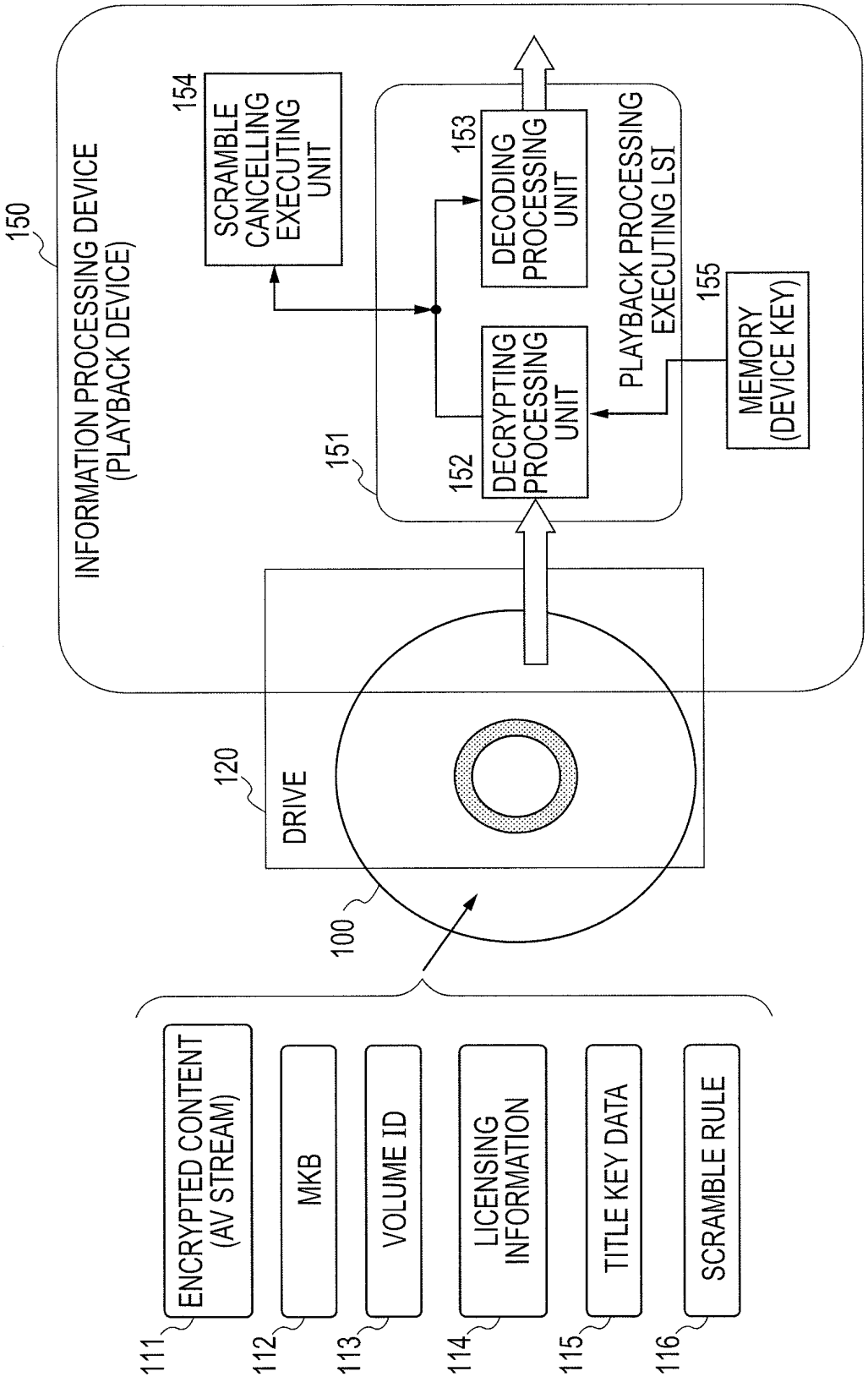


FIG. 2

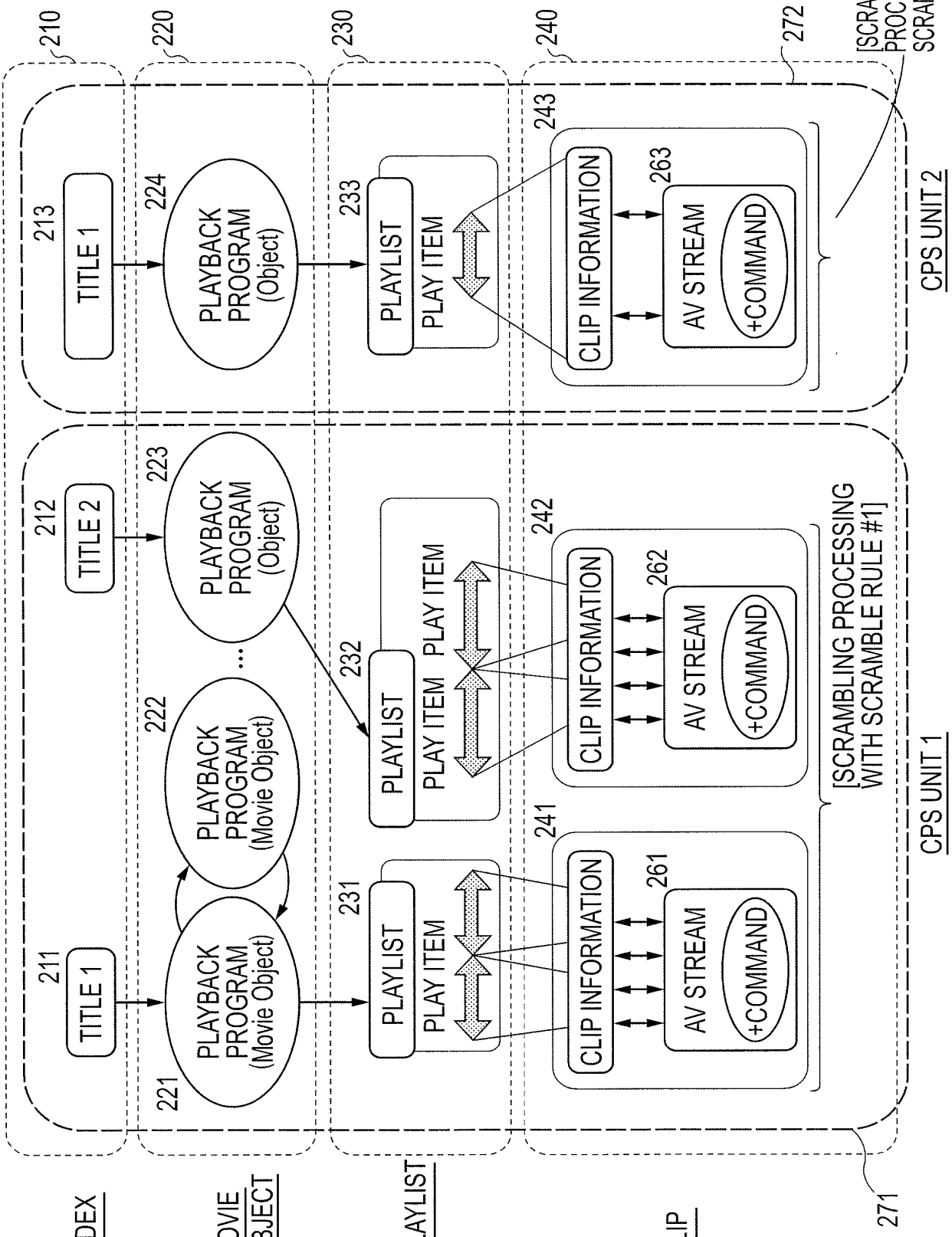

(A) INDEX
(B) MOVIE OBJECT
(C) PLAYLIST
(D) CLIP
210
220
230
240
271
272
211
TITLE 1
212
TITLE 2
213
TITLE 1
221
PLAYBACK PROGRAM (Movie Object)
222
PLAYBACK PROGRAM (Movie Object)
223
PLAYBACK PROGRAM (Object)
224
PLAYBACK PROGRAM (Object)
231
PLAYLIST
PLAY ITEM
232
PLAYLIST
PLAY ITEM
PLAY ITEM
233
PLAYLIST
PLAY ITEM
241
CLIP INFORMATION
261
AV STREAM
+COMMAND
242
CLIP INFORMATION
262
AV STREAM
+COMMAND
243
CLIP INFORMATION
263
AV STREAM
+COMMAND
[SCRAMBLING PROCESSING WITH SCRAMBLE RULE #1]
[SCRAMBLING PROCESSING WITH SCRAMBLE RULE #2]
CPS UNIT 1
CPS UNIT 2

FIG. 3

INDEX DISTINGUISHABLE BY APPLICATION LAYERS SUCH AS TITLE	CONTENT MANAGEMENT UNIT (CPS)	SCRAMBLE RULE
TITLE 1	CPS1	Scr#1
TITLE 2	CPS1	Scr#1
APPLICATION 1	CPS2	Scr#2
APPLICATION 2	CPS3	Scr#3
:	:	:
DATA GROUP 1	CPS4	Scr#4
DATA GROUP 2	CPS5	Scr#5
:	:	:

FIG. 4

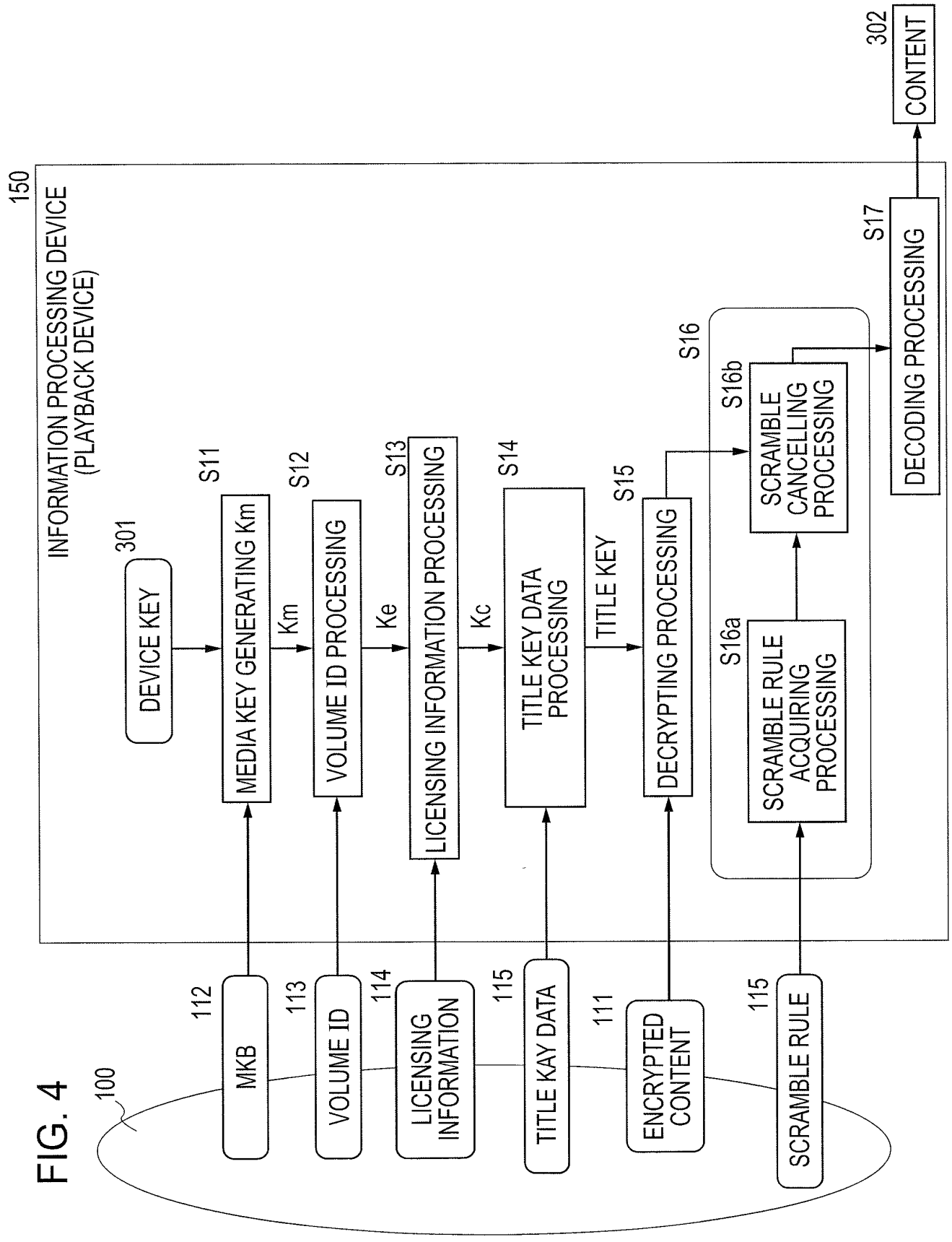
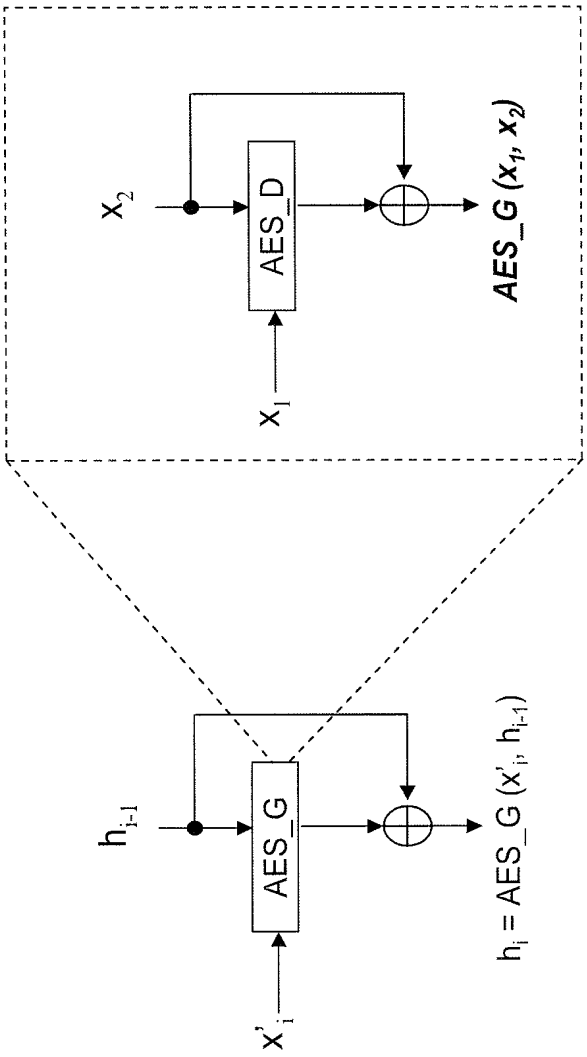

100
MKB
112
VOLUME ID
113
LICENSING INFORMATION
114
TITLE KAY DATA
115
ENCRYPTED CONTENT
111
SCRAMBLE RULE
115
150
INFORMATION PROCESSING DEVICE
(PLAYBACK DEVICE)
301
DEVICE KEY
S11
MEDIA KEY GENERATING Km
Km
S12
VOLUME ID PROCESSING
Ke
S13
LICENSING INFORMATION PROCESSING
Kc
S14
TITLE KEY DATA PROCESSING
TITLE KEY
S15
DECRYPTING PROCESSING
S16
S16a
SCRAMBLE RULE ACQUIRING PROCESSING
S16b
SCRAMBLE CANCELLING PROCESSING
S17
DECODING PROCESSING
302
CONTENT

FIG. 5



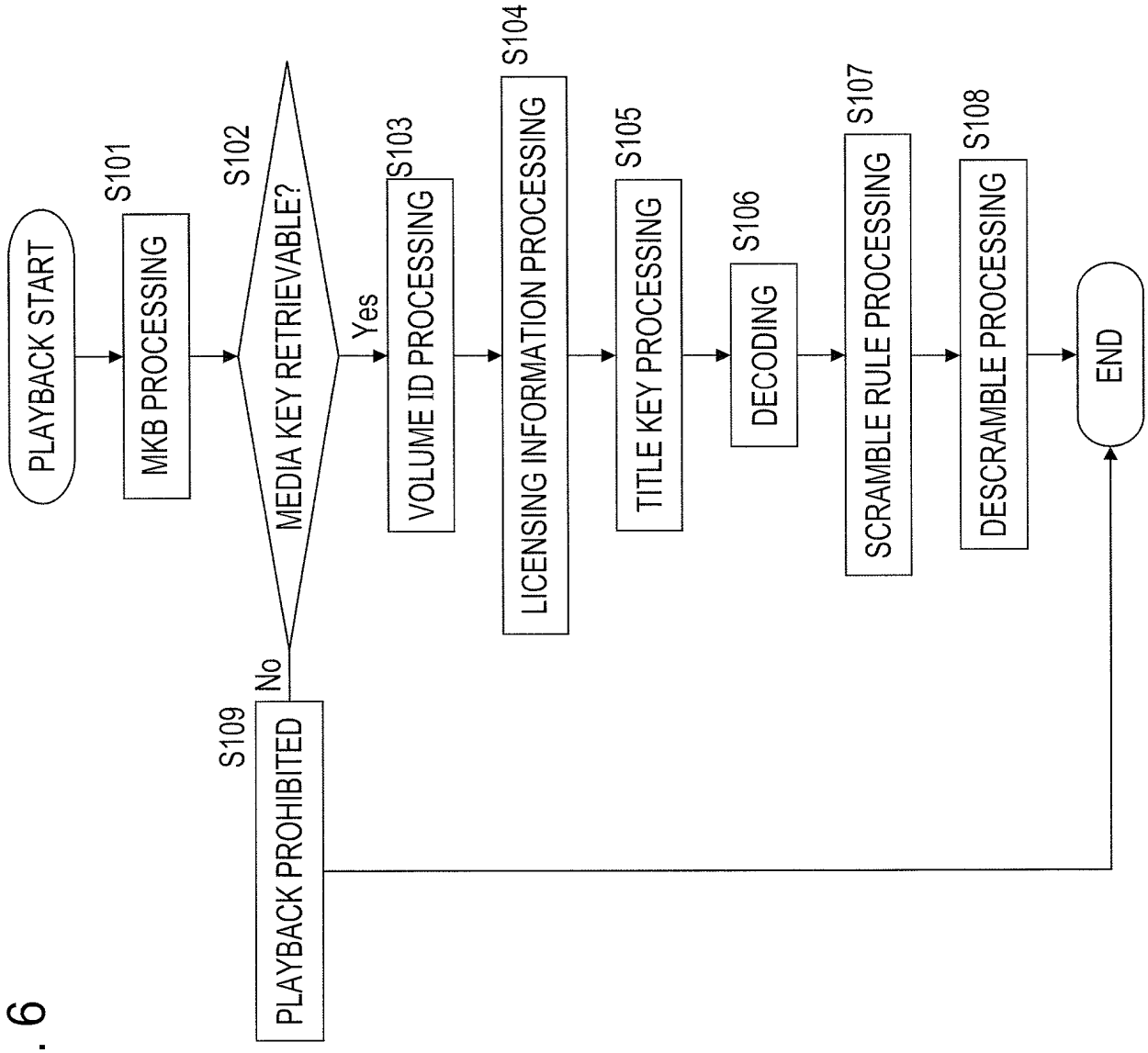

PLAYBACK START
S101
MKB PROCESSING
S102
MEDIA KEY RETRIEVABLE?
Yes
S103
VOLUME ID PROCESSING
S104
LICENSING INFORMATION PROCESSING
S105
TITLE KEY PROCESSING
S106
DECODING
S107
SCRAMBLE RULE PROCESSING
S108
DESCRAMBLE PROCESSING
END
No
S109
PLAYBACK PROHIBITED

FIG. 6

FIG. 7

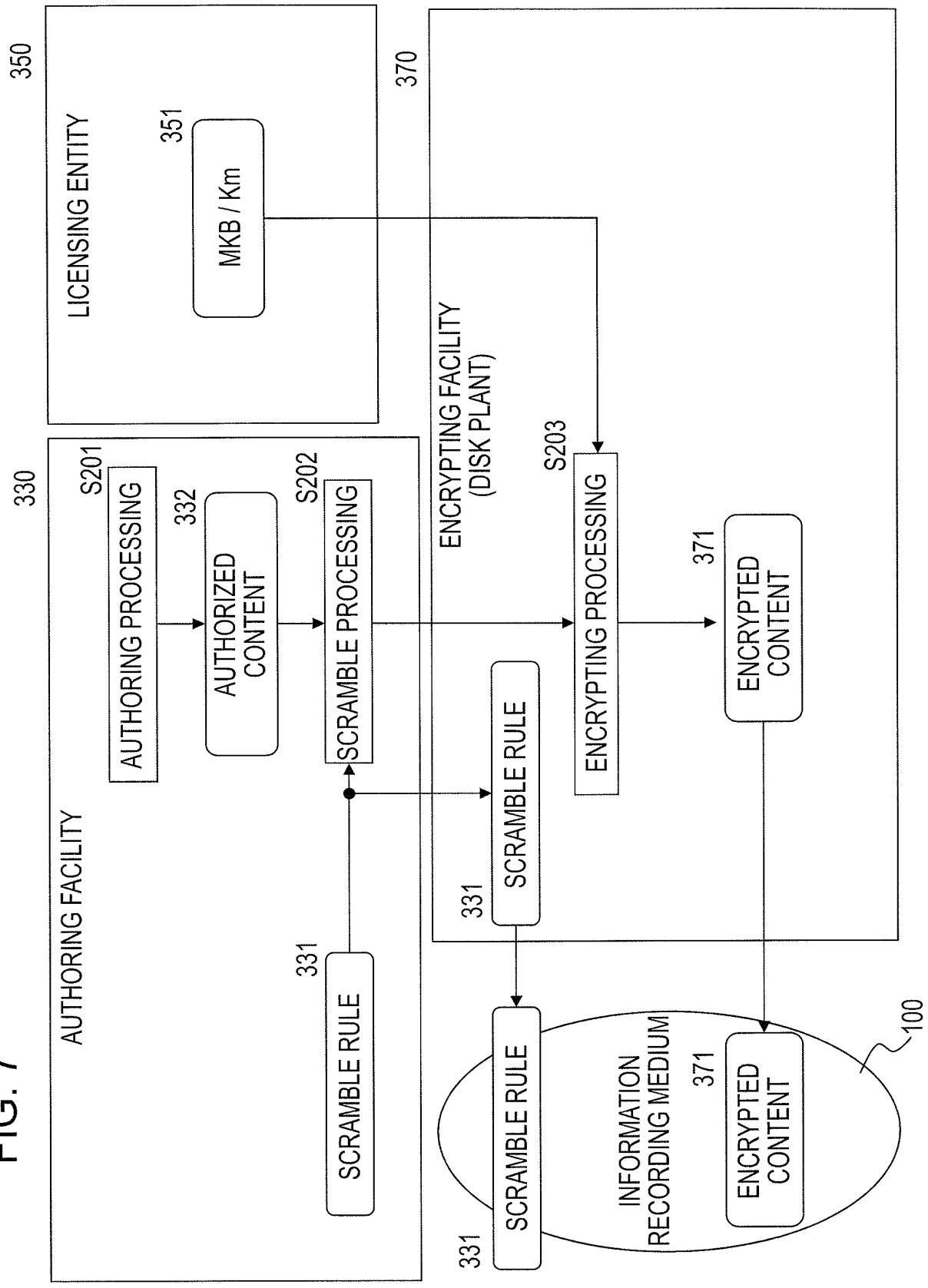

350
LICENSING ENTITY
351
MKB / Km
370
ENCRYPTING FACILITY
(DISK PLANT)
330
AUTHORING FACILITY
S201
AUTHORING PROCESSING
332
AUTHORIZED CONTENT
S202
SCRAMBLE PROCESSING
S203
ENCRYPTING PROCESSING
371
ENCRYPTED CONTENT
331
SCRAMBLE RULE
331
SCRAMBLE RULE
INFORMATION RECORDING MEDIUM
371
ENCRYPTED CONTENT
331
SCRAMBLE RULE
100

FIG. 8

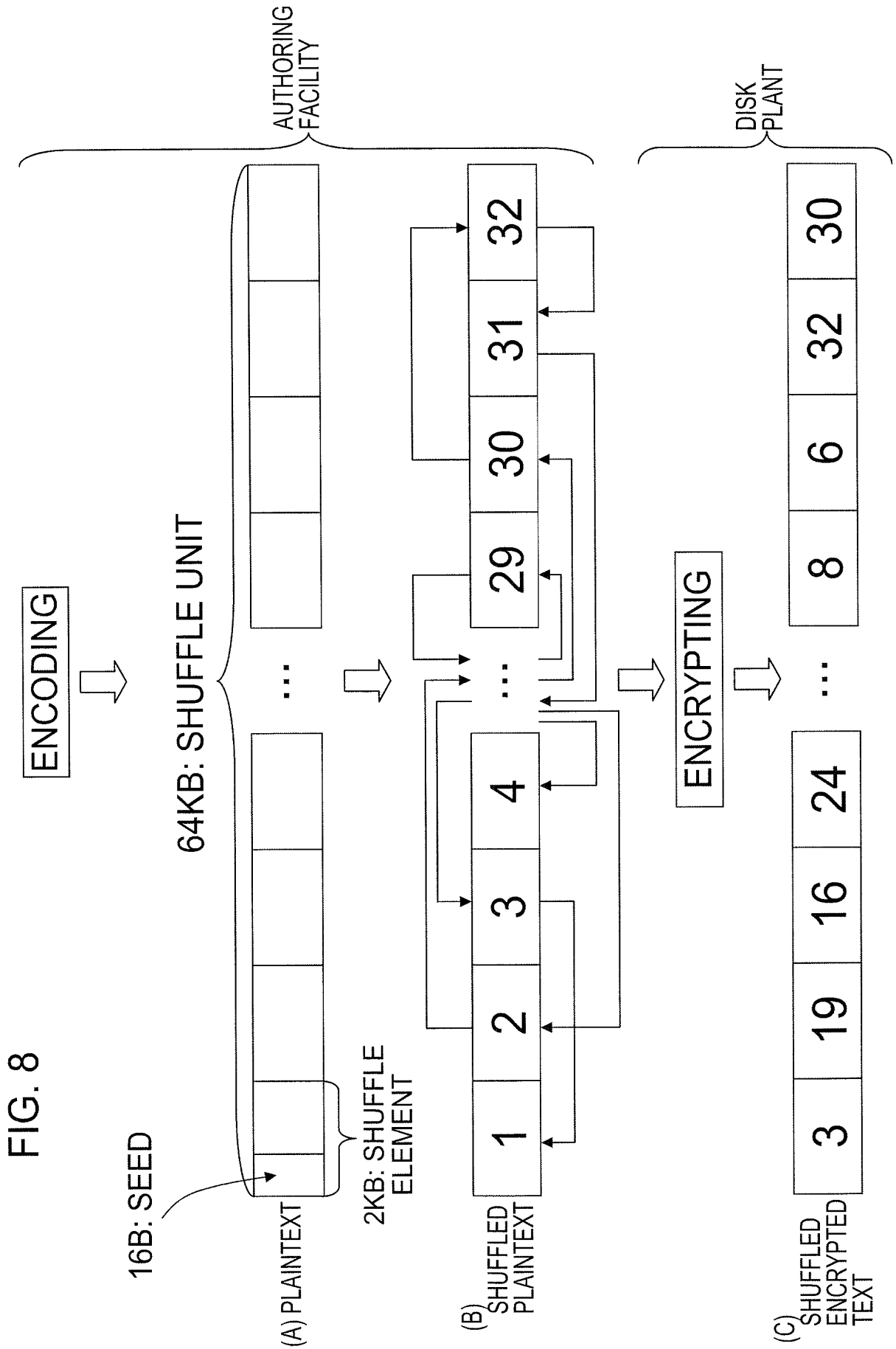

AUTHORING FACILITY
DISK PLANT
ENCODING
64KB: SHUFFLE UNIT
ENCRYPTING
16B: SEED
2KB: SHUFFLE ELEMENT
(A) PLAINTEXT
(B) SHUFFLED PLAINTEXT
(C) SHUFFLED ENCRYPTED TEXT
1
2
3
4
29
30
31
32
3
19
16
24
8
6
32
30

FIG. 9

(A) SCRAMBLE RULE (IN THE EVENT THAT THERE ARE 32 SHUFFLE ELEMENTS WITHIN THE SHUFFLE UNIT)

3	19	16	24	26	18	10	2
28	20	12	4	1	15	25	9
22	11	21	31	7	29	13	23
5	17	27	14	8	6	32	30

(B1) BEFORE SHUFFLING

1	2	3	4	5	6	7	8	9	10	11	12	.....	28	29	30	31	32

(B2) AFTER SHUFFLING

3	19	16	24	26	18	10	2	28	20	12	4	.....	14	8	6	32	30

FIG. 10

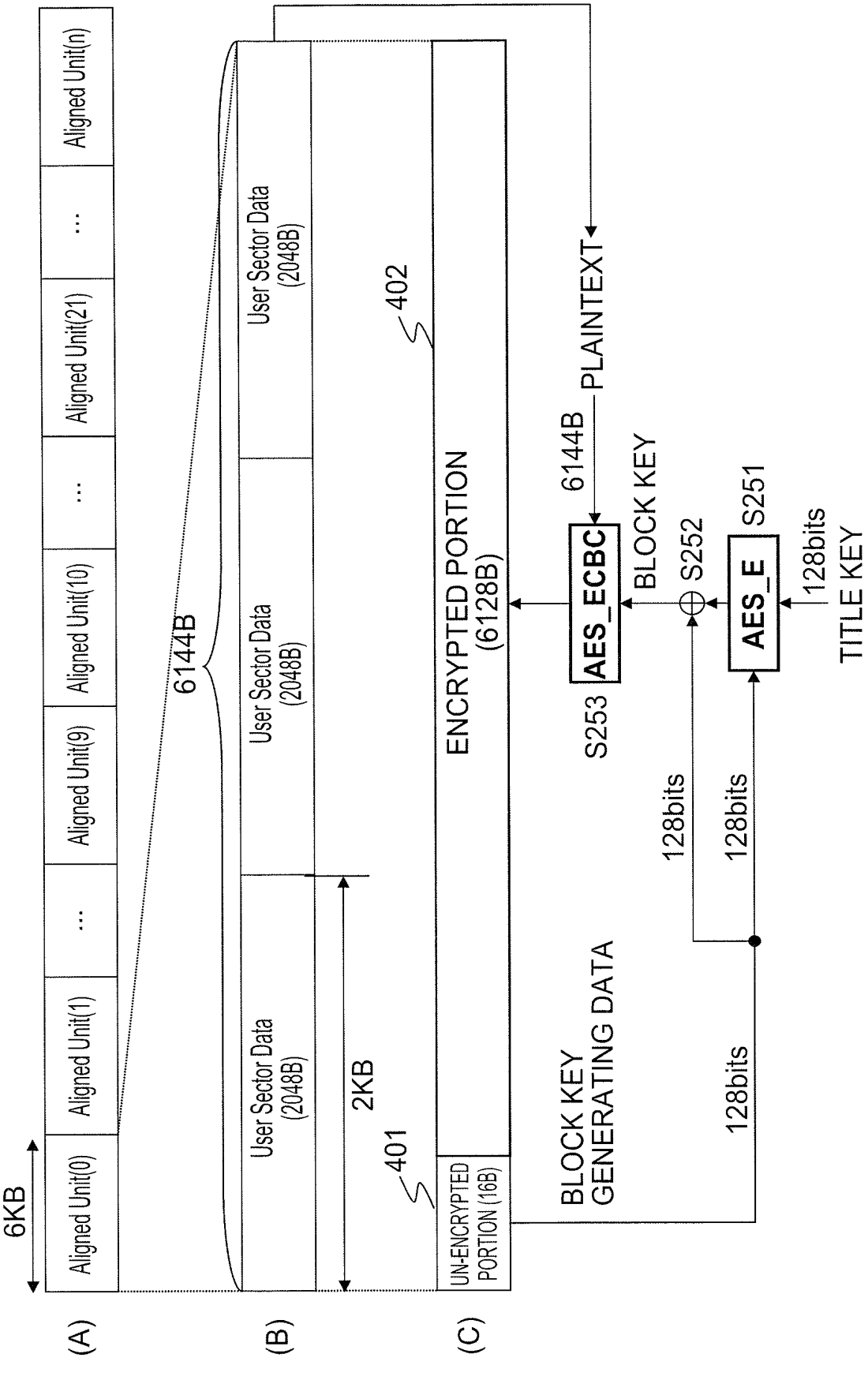

Aligned Unit (6KB ENCRYPTION)
6KB
Aligned Unit(0)
Aligned Unit(1)
...
Aligned Unit(9)
Aligned Unit(10)
...
Aligned Unit(21)
...
Aligned Unit(n)
6144B
User Sector Data (2048B)
User Sector Data (2048B)
User Sector Data (2048B)
2KB
401
402
ENCRYPTED PORTION (6128B)
UN-ENCRYPTED PORTION (16B)
(A)
(B)
(C)
BLOCK KEY GENERATING DATA
128bits
128bits
128bits
S253
AES_ECBC
6144B
PLAINTEXT
BLOCK KEY
S252
AES_E
S251
128bits
TITLE KEY

FIG. 11

CBC (Cipher Block Chaining) MODE (ENCRYPTED)

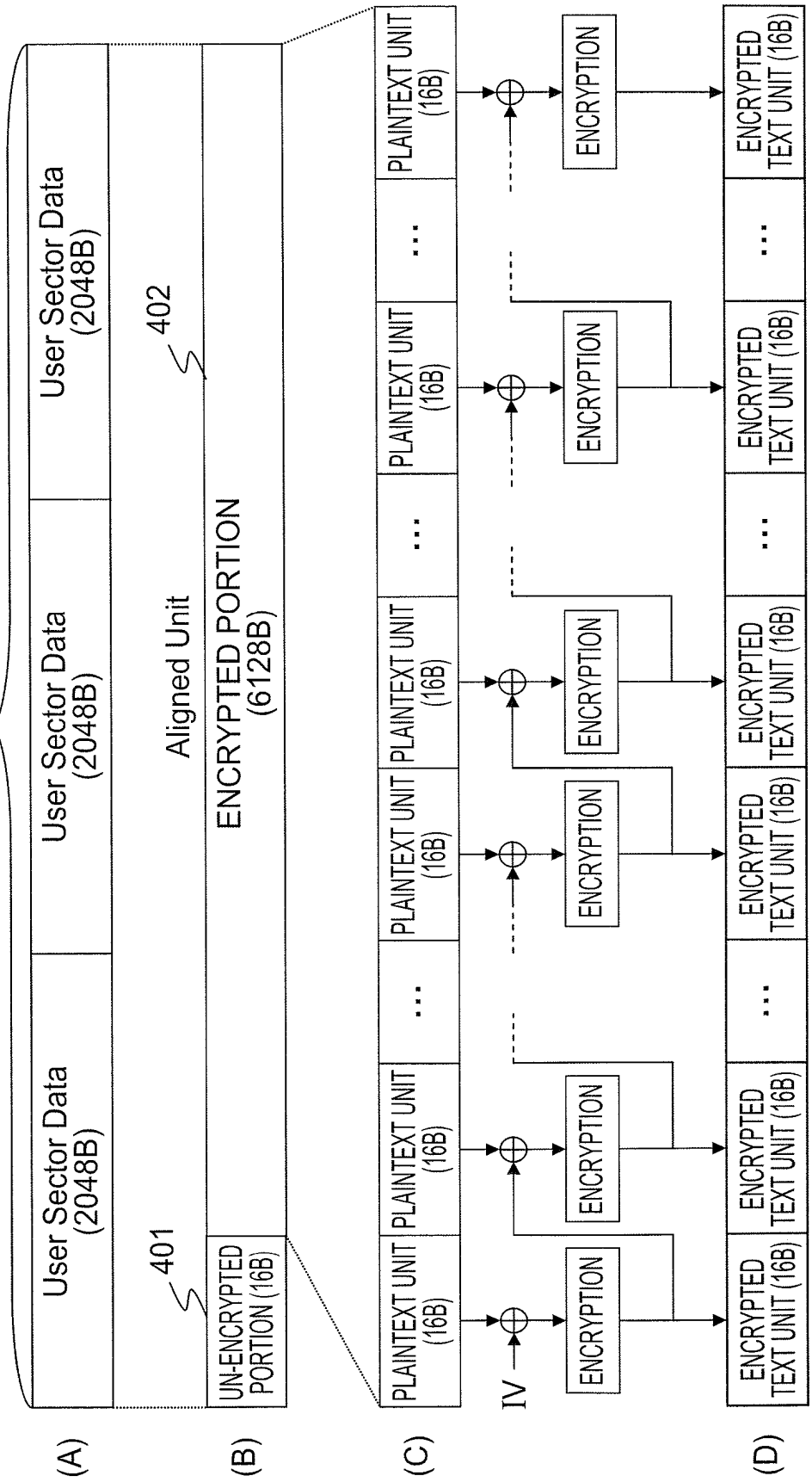


FIG. 12

User Sector Data (2KB ENCRYPTION)

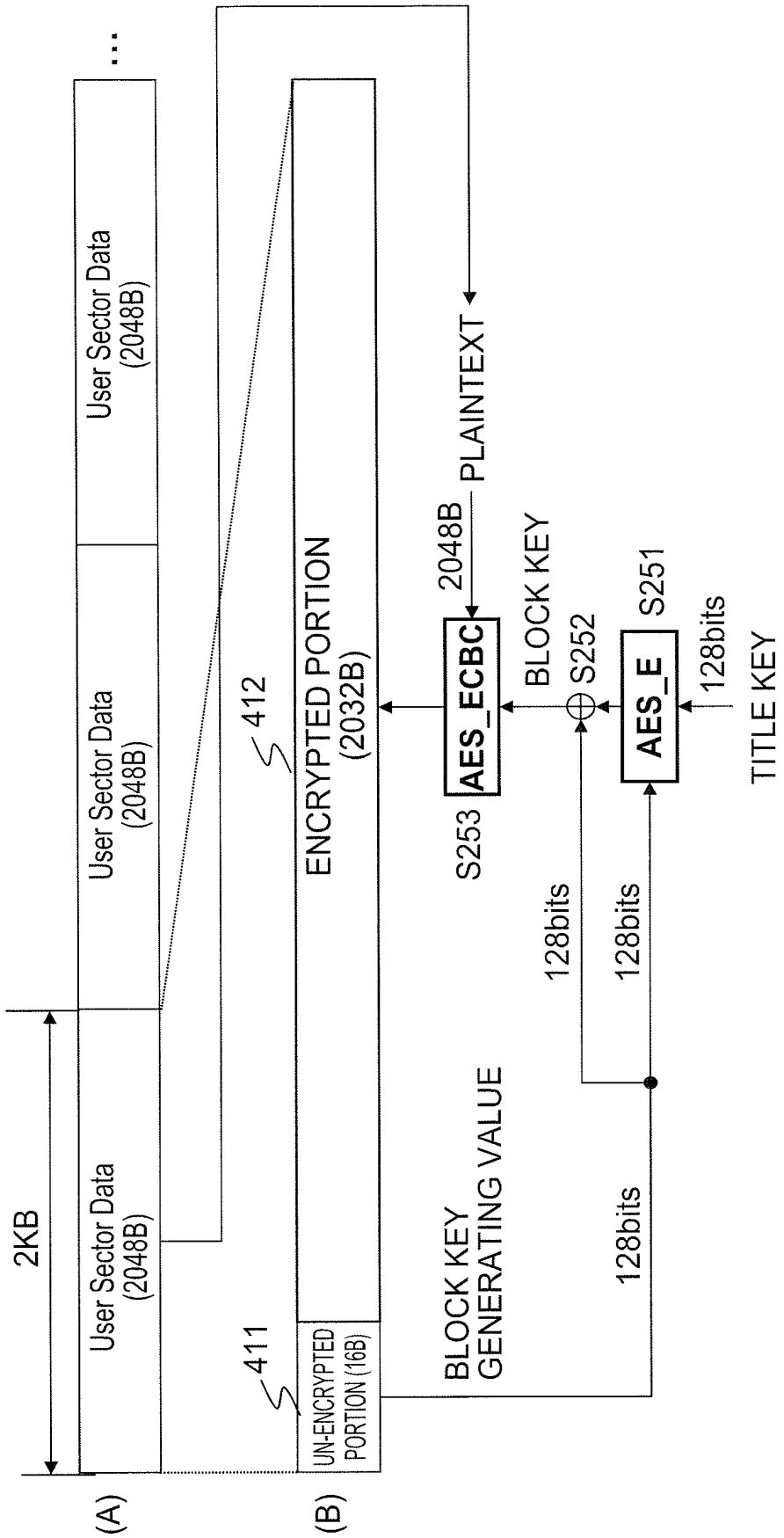


FIG. 13

MSTBL.DA (THELP FILE FOR ENCRYPTING IN DISK PLANT)

	#bits	value
Li_MSTBL.DAT( ){		
UD_START_Location	32	
UD_END_Location	32	
CHT_Location	32	
CHT_Offset	32	
Content_Cert_Location	32	
Content_Cert_Offset	32	
UK_Inf_Location	32	
UK_Inf_Offset	32	
Num_of_UK	32	
MKB_Location	32	
For (j = 1; j =<N, j++) {		
Encryption_Flag(j)	8	00_{16}: not to-be-encrypted 01_{16}: to-be-encrypted
Data_Type(j)	8	01_{16}: 1st sector of AU 02_{16}: 2nd sector of AU 03_{16}: 3rd sector of AU 04_{16}: Non-AV data (e.g. Java)
CPS_Unit_No(j)	16	0000_{16}-$FFFF_{16}$
Clip_AV_File_No(j)	24	00000-99999
Reserved	6	000000_2
Last_Sector_of_Clip(j)	1	0_2: not Last Sector of each Clip 1_2: Last Sector of each Clip
Last_Sector_of_Layer(j)	1	0_2: not Last Sector of each Clip in layer i 1_2: Last Sector of each Clip in each layer i
}		
}		

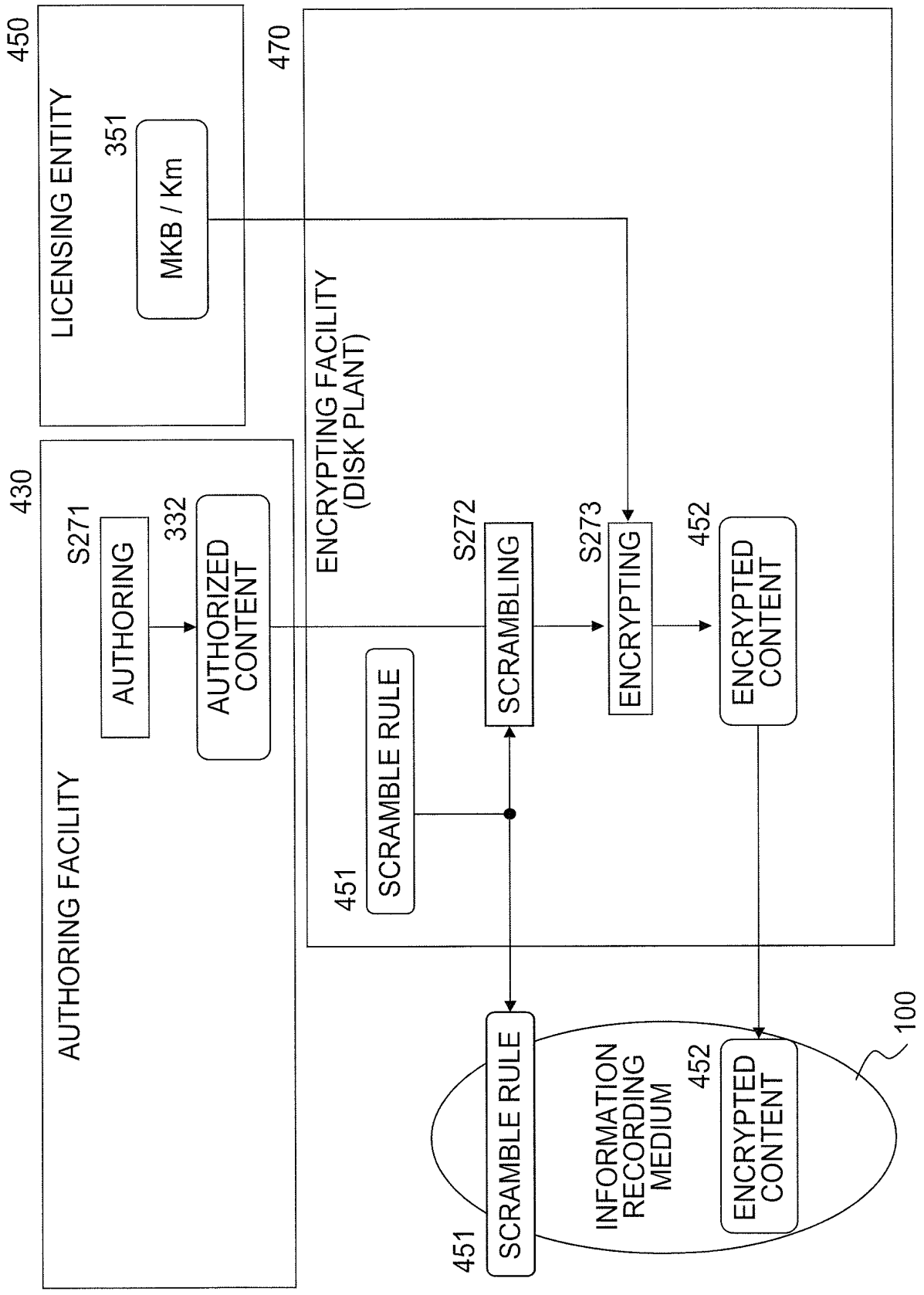
REPLACEMENT DRAWINGS
USSN: 10/595,960; Filed 05/22/2006
Attorney Docket No. 112857-767

FIG. 14

SYNTAX OF MSTBL.DAT

UD_START_Location: Physical Sector Number OF START LOCATION OF User Data FOR EACH Layer (Data Zone)
UD_END_Location: Physical Sector Number OF END LOCATION OF User Data FOR EACH Layer (Data Zone)
CHT_Location: Physical Sector Number of CHT START LOCATION.
CHT_Offset: NUMBER OF BYTES UNTIL DIRECTLY BEFORE Hash Value (DATA TO BE FILLED IN BY Mastering Facility) AND START LOCATION OF CHT.
Content_Cert_Location: Physical Sector Number of Content Certificate START LOCATION.
Content_Cert_Offset: NUMBER OF BYTES UNTIL DIRECTLY BEFORE Content ID (DATA TO BE FILLED IN BY Mastering Facility) AND START LOCATION OF Content Certificate.
UK_Inf_Location: Physical Sector Number OF TITLE KEY FILE START LOCATION. IF NO Unit_Key.inf STORED IN THAT Layer, SPECIFY 00000000_{16}.
UK_Inf_Offset: NUMBER OF BYTES UNTIL DIRECTLY BEFORE Encrypted Unit Key for CPS Unit #1 and THE START LOCATION OF Unit_Key.inf.
Num_of_UK: NUMBER OF Unit Keys OF ENTIRE Disc (= NUMBER OF CPS Units).
MKB_Location: Physical Sector Number OF MKB START LOCATIONS. IN THE EVENT THAT NO MKB_Cert IS STORED, SPECIFY 00000000_{16}.
N: Logical Sector NUMBER OF Layer i.
Encryption_Flag: Flag FOR WHETHER OR NOT TO ENCRYPT.
Data_Type: Flag SHOWING Type OF Sector.
CPS_Unit_No: CPS Unit Number.
Clip_AV_File_No: CLIP FILE NUMBER. INFORMATION TO BE USED FOR THE PURPOSE OF CHT CREATION.
Last_Sector_of_Clip: FLAG SHOWING LAST Sector OF EACH CLIP (REGARDLESS OF Layer).
Last_Sector_of_Layer: FLAG SHOWING LAST Sector OF EACH CLIP IN EACH Layer.

FIG. 15


450
LICENSING ENTITY
351
MKB / Km
470
ENCRYPTING FACILITY
(DISK PLANT)
430
AUTHORING FACILITY
S271
AUTHORING
332
AUTHORIZED CONTENT
S272
SCRAMBLING
S273
ENCRYPTING
452
ENCRYPTED CONTENT
451
SCRAMBLE RULE
INFORMATION RECORDING MEDIUM
100
451
SCRAMBLE RULE
452
ENCRYPTED CONTENT

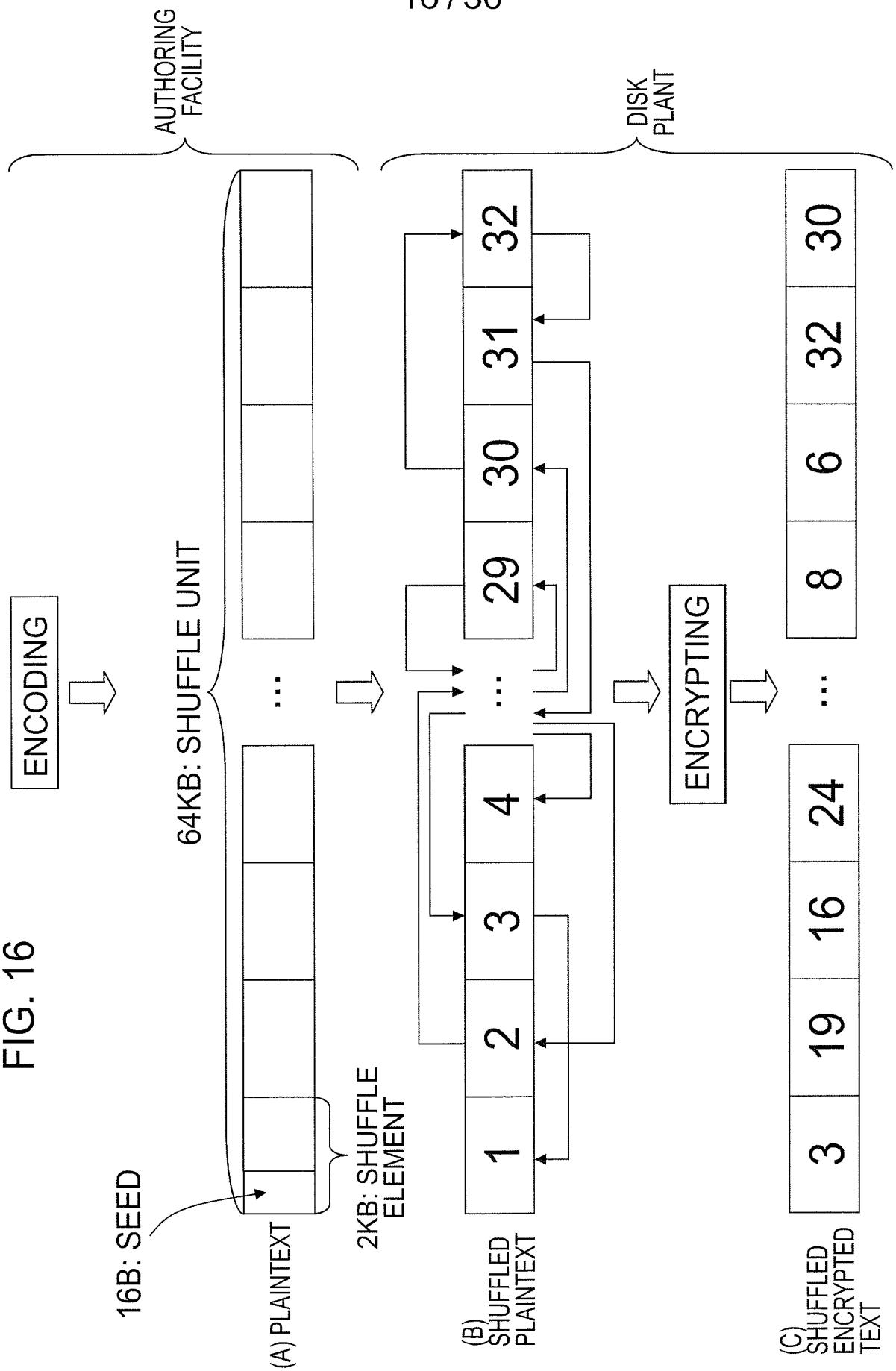

AUTHORING FACILITY
DISK PLANT
ENCODING
64KB: SHUFFLE UNIT
16B: SEED
2KB: SHUFFLE ELEMENT
(A) PLAINTEXT
(B) SHUFFLED PLAINTEXT
ENCRYPTING
(C) SHUFFLED ENCRYPTED TEXT
1
2
3
4
29
30
31
32
3
19
16
24
8
6
32
30

FIG. 16

FIG. 17

MPEG-2 transport stream

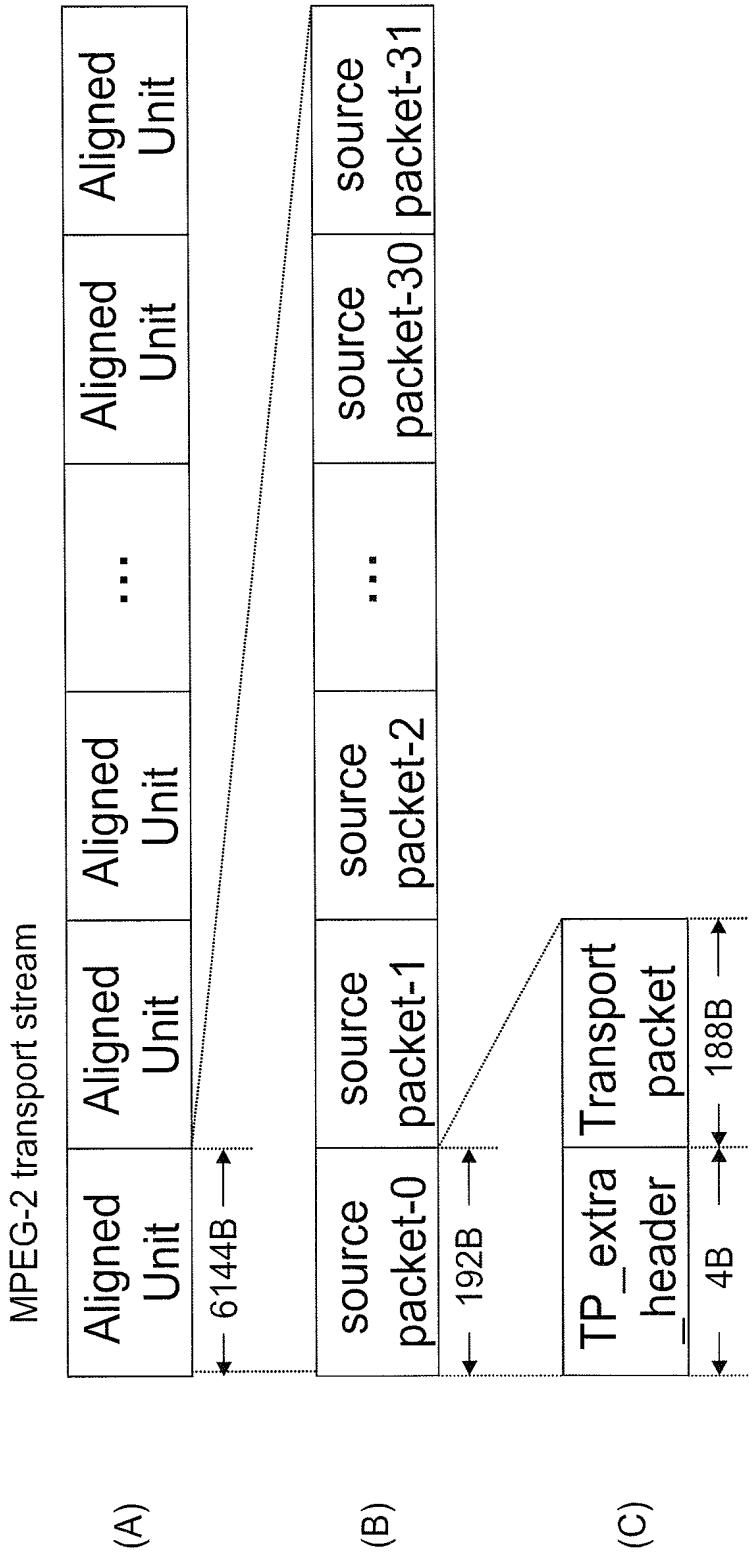


FIG. 18

(A) SYNTAX OF source_packet

	#bits
source_packet(){	
TP_extra_header()	4
transport_packet()	188
}	

(B) SYNTAX OF TP_extra_header

	#bits
TP_extra_header(){	
is_not_free	1
is_encrypted	1
arrival_time_stamp	30
}	

FIG. 19

SYNTAX OF transport_packet

```
                                                        #bits
transport_packet(){
    sync_byte                                           8
    transport_error_indicator                           1
    payload_unit_start_indicator                        1
    transport_priority                                  1
    PID                                                 13
    transport_scrambling_contorl                        2
    adaptation_field_control                            2
    continuity_counter                                  4
    if (adaptation_field_control==‘   || adaptation_filed_control==’11’) {
            adaptation field()
    }
     if (adaptation_field_control==‘   || adaptation_filed_control==’11’) {

            adaptation field()
    }
     if (adaptation_field_control==‘   || adaptation_filed_control==’11’) {
            for (i=0; i<N; i++) {
                    data_byte                           8
            }
    }
}
```

FIG. 20

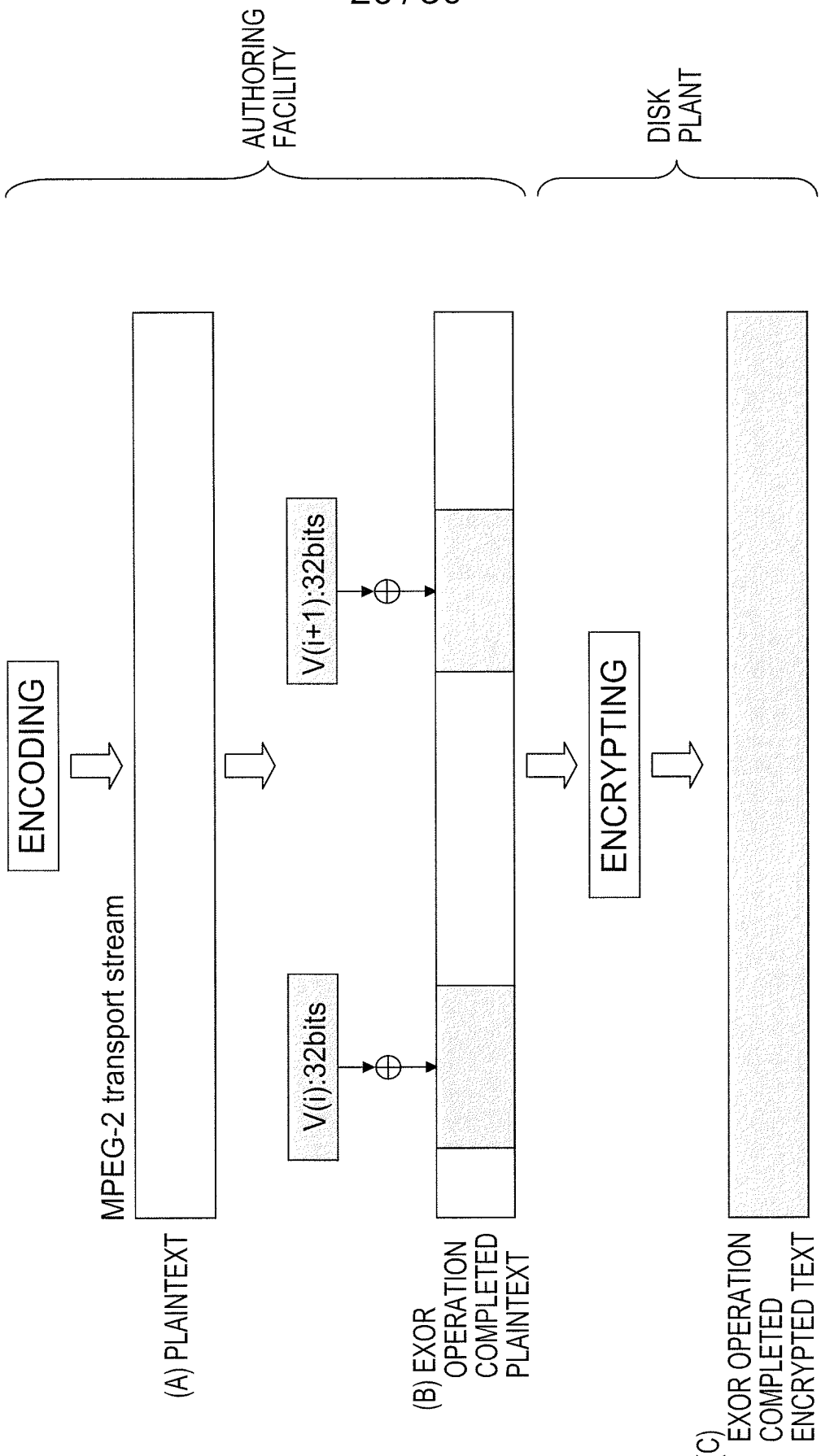
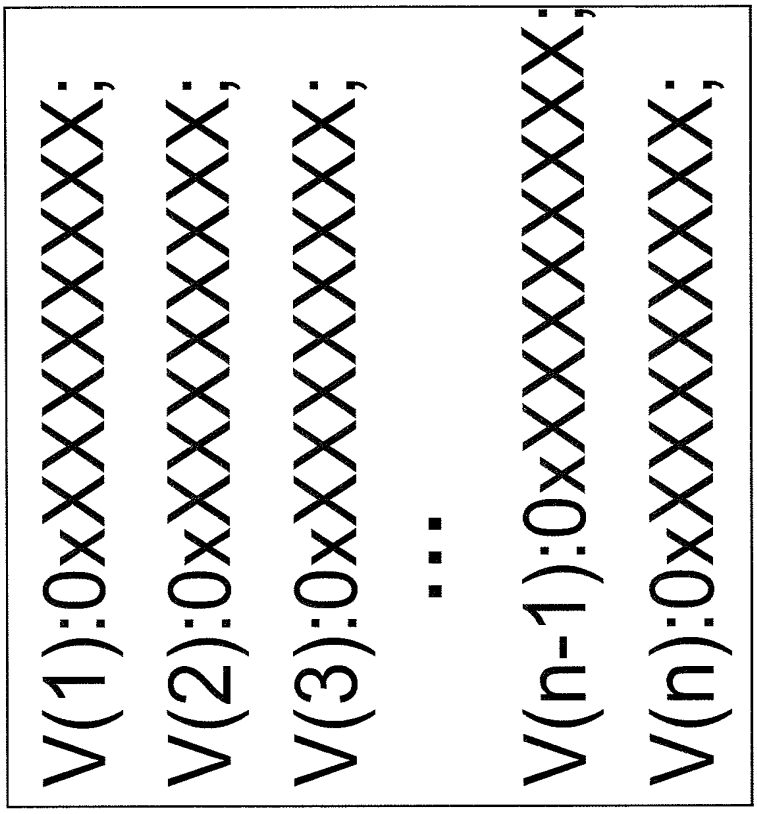

AUTHORING FACILITY
DISK PLANT
ENCODING
MPEG-2 transport stream
(A) PLAINTEXT
V(i):32bits
V(i+1):32bits
(B) EXOR OPERATION COMPLETED PLAINTEXT
ENCRYPTING
(C) EXOR OPERATION COMPLETED ENCRYPTED TEXT

FIG. 21


V(1):0xXXXXXXXX;
V(2):0xXXXXXXXX;
V(3):0xXXXXXXXX;
...
V(n-1):0xXXXXXXXX;
V(n):0xXXXXXXXX;

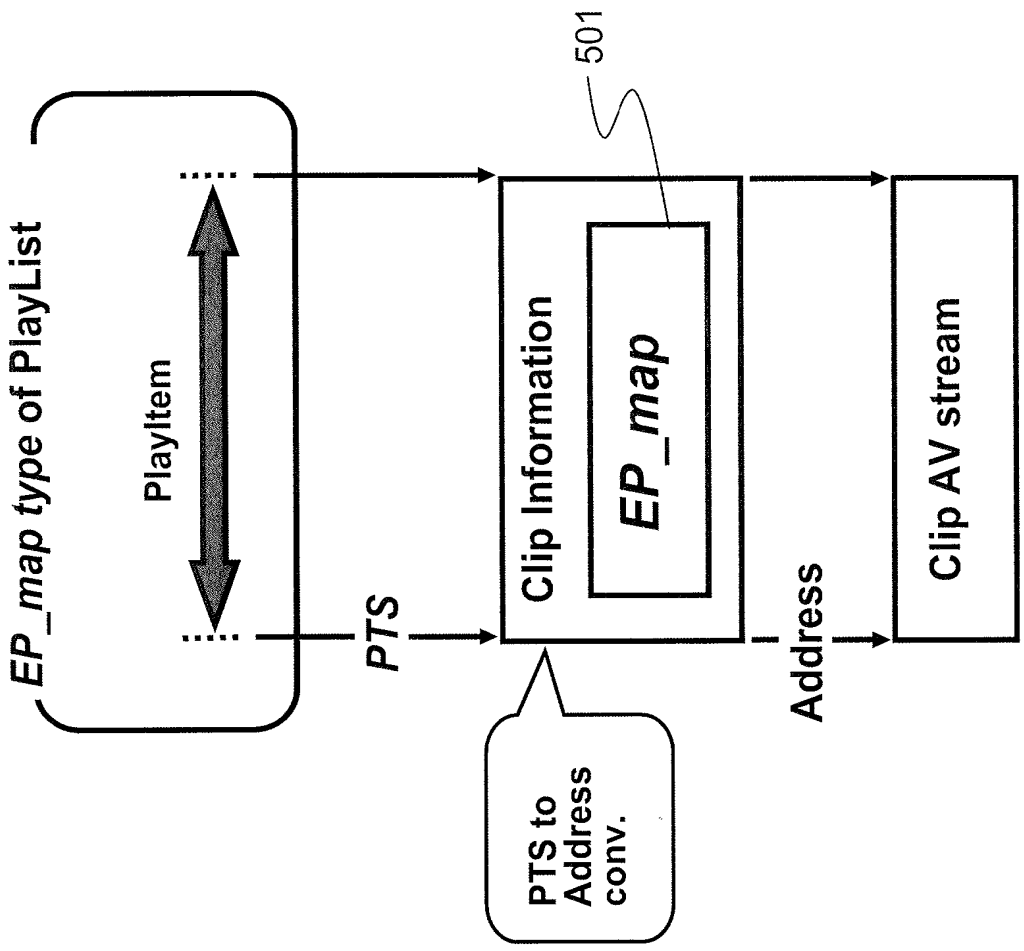

501
EP_map type of PlayList
PlayItem
PTS
Clip Information
EP_map
Address
Clip AV stream
PTS to Address conv.

FIG. 22

FIG. 23

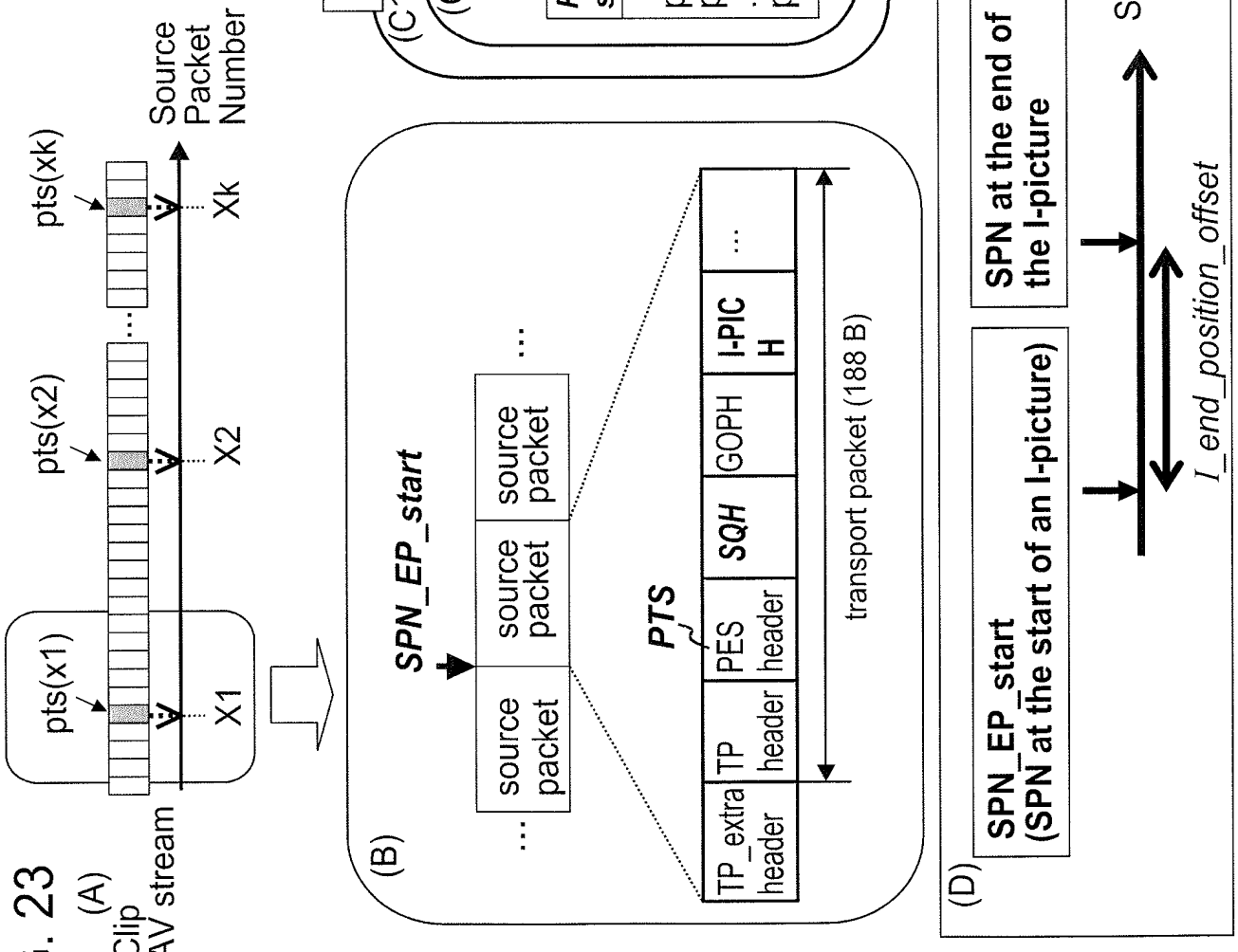
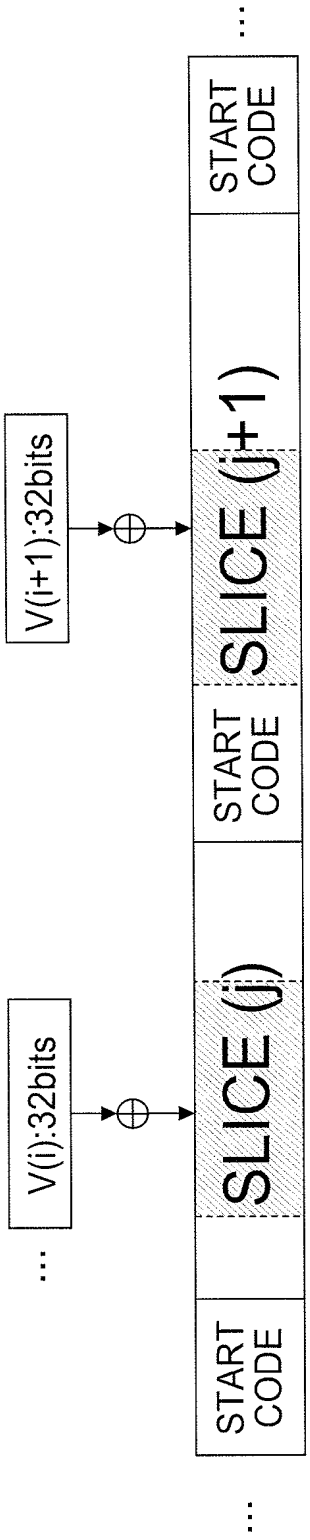

(A)
Clip
AV stream
pts(x1)
pts(x2)
pts(xk)
X1
X2
Xk
Source Packet Number
(B)
SPN_EP_start
source packet
PTS
TP_extra header
TP header
PES header
SQH
GOPH
I-PIC H
transport packet (188 B)
Clip Information
(C1)
(C2)
EP_map for Video
stream_PID = x
num-EP-entries = k
PTS_EP start
SPN_EP start
I_end position_offset
pts(x1) X1 xx1
pts(x2) X2 xx2
pts(xi) Xi xxi
(D)
SPN_EP_start
(SPN at the start of an I-picture)
SPN at the end of the I-picture
SPN (Source Packet Number)
I_end_position_offset

FIG. 24



- EACH SLICE IS CODED BY VLC, AND SO BY CHANGING THE VALUE OF A PORTION OF THE CODE THEREOF, THE ENTIRE SLICE CANNOT BE DECODED.
- FURTHER, BY CHANGING THE VALUE OF AN I-PICTURE SLICE, THE ENTIRE CORRESPONDING GOP IS INFLUENCED.
- START CODE: SYNCHRONOUS CODE SHOWING THE HEAD OF THE NEXT SLICE.

FIG. 25

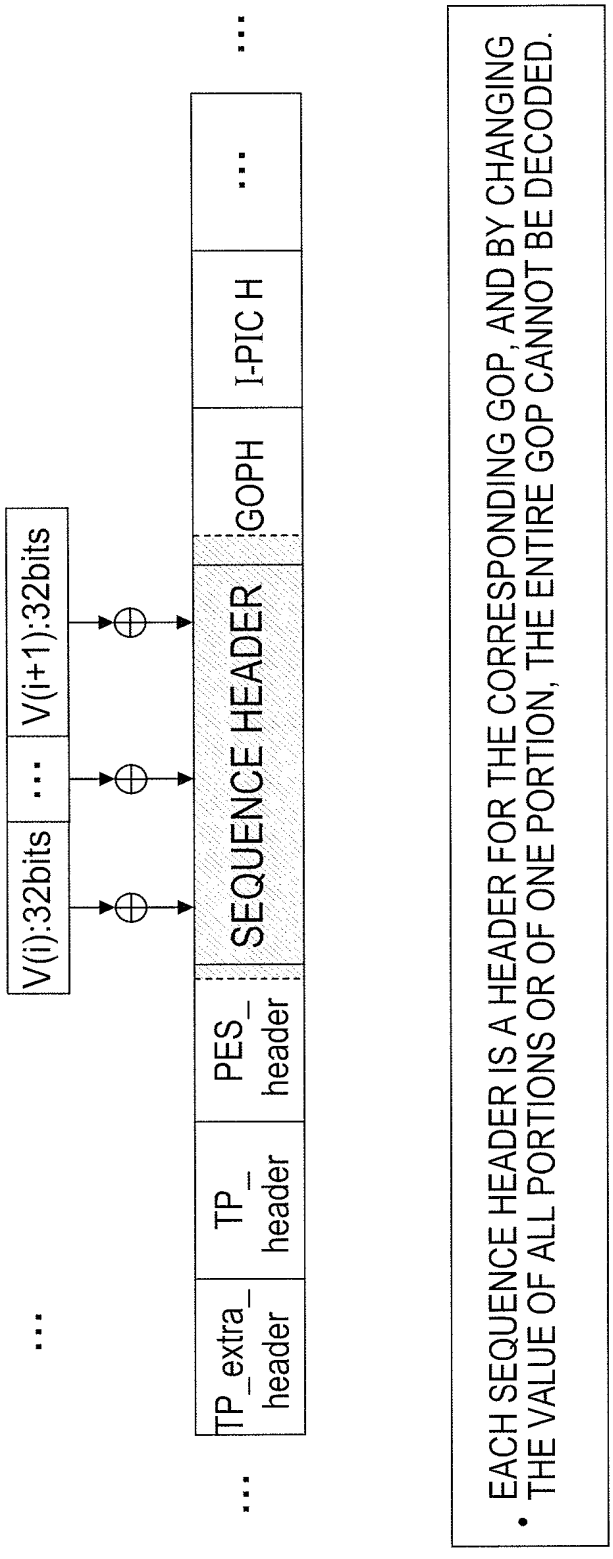

V(i):32bits
...
V(i+1):32bits
...
TP_extra_header
TP_header
PES_header
SEQUENCE HEADER
GOPH
I-PIC H
...
...
• EACH SEQUENCE HEADER IS A HEADER FOR THE CORRESPONDING GOP, AND BY CHANGING THE VALUE OF ALL PORTIONS OR OF ONE PORTION, THE ENTIRE GOP CANNOT BE DECODED.

FIG. 26

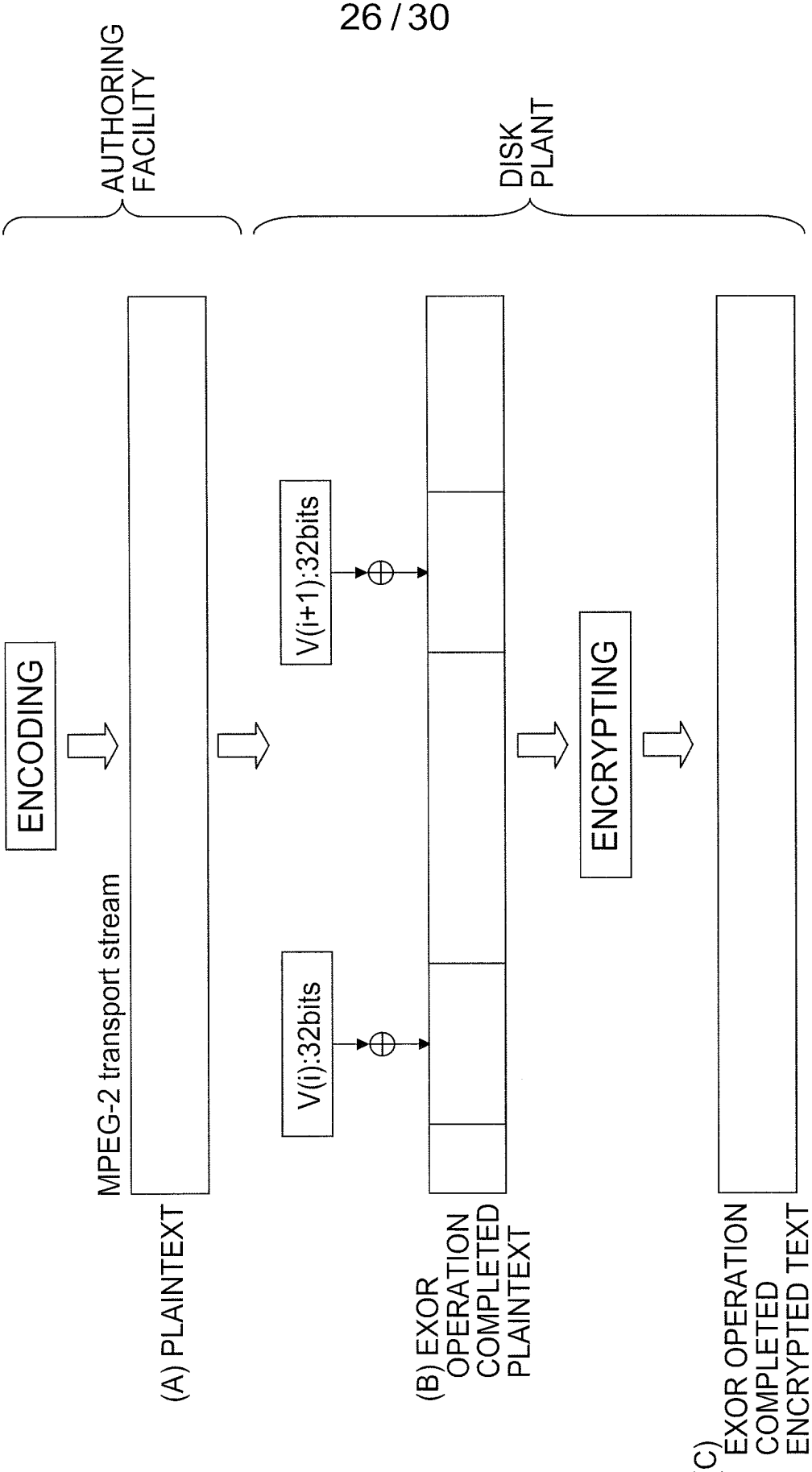

AUTHORING FACILITY
DISK PLANT
ENCODING
MPEG-2 transport stream
(A) PLAINTEXT
V(i):32bits
V(i+1):32bits
(B) EXOR OPERATION COMPLETED PLAINTEXT
ENCRYPTING
(C) EXOR OPERATION COMPLETED ENCRYPTED TEXT

FIG. 27

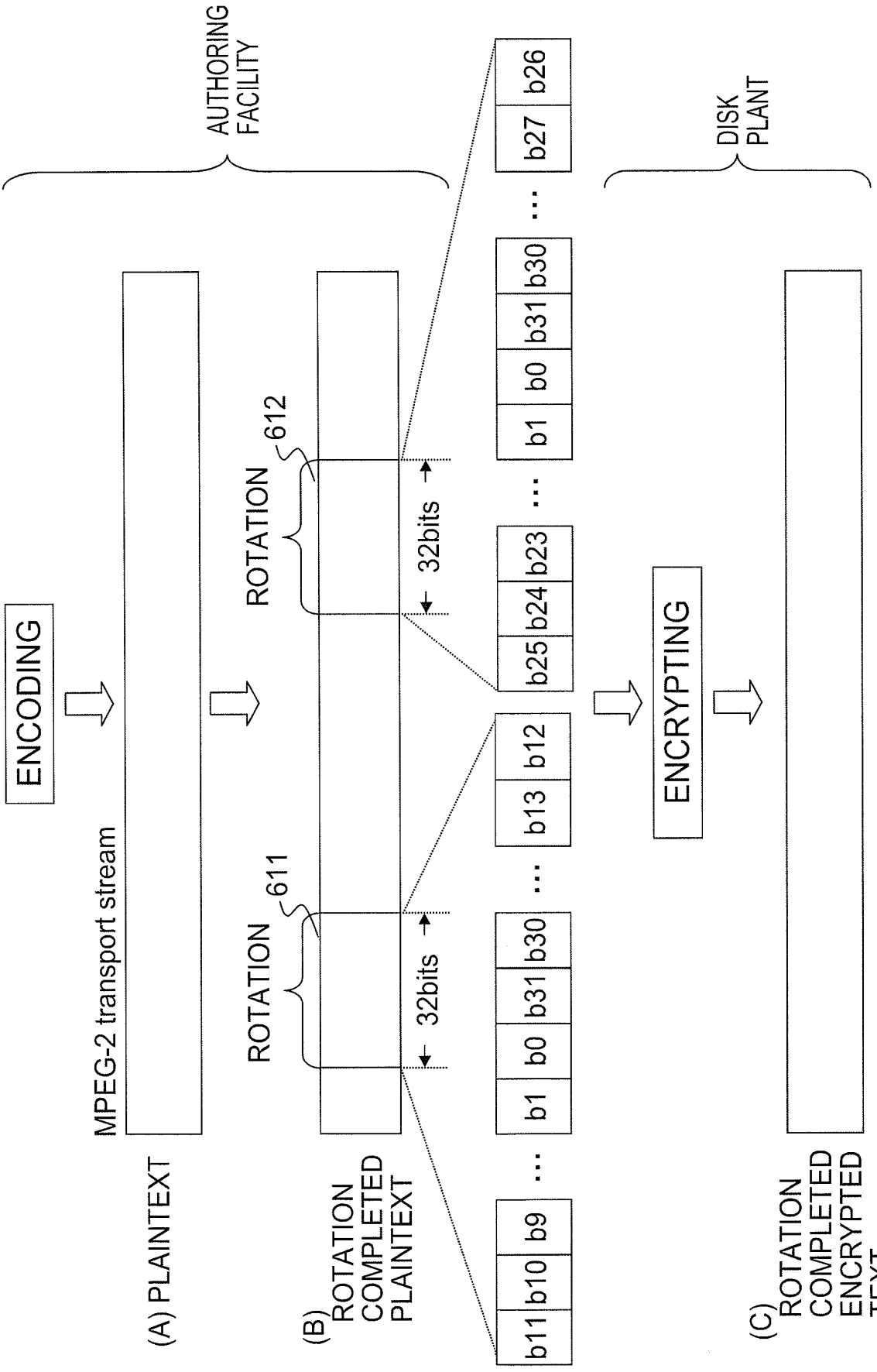

AUTHORING FACILITY
DISK PLANT
ENCODING
MPEG-2 transport stream
(A) PLAINTEXT
ROTATION
612
ROTATION
611
32bits
32bits
(B) ROTATION COMPLETED PLAINTEXT
b11 b10 b9 ... b1 b0 b31 b30
b13 b12 ... b25 b24 b23 ... b1 b0 b31 b30
b27 b26 ...
ENCRYPTING
(C) ROTATION COMPLETED ENCRYPTED TEXT

FIG. 28

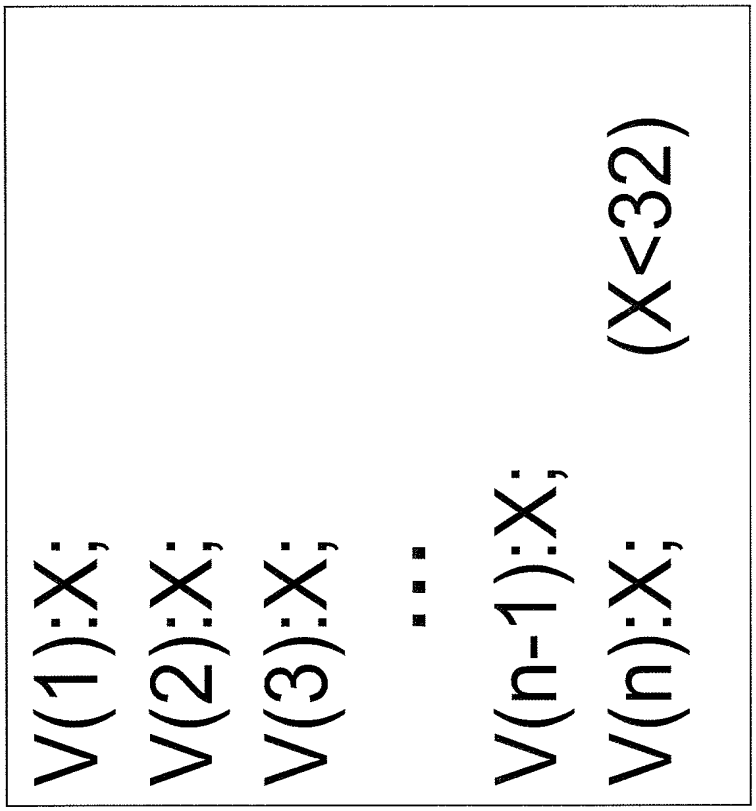


FIG. 29

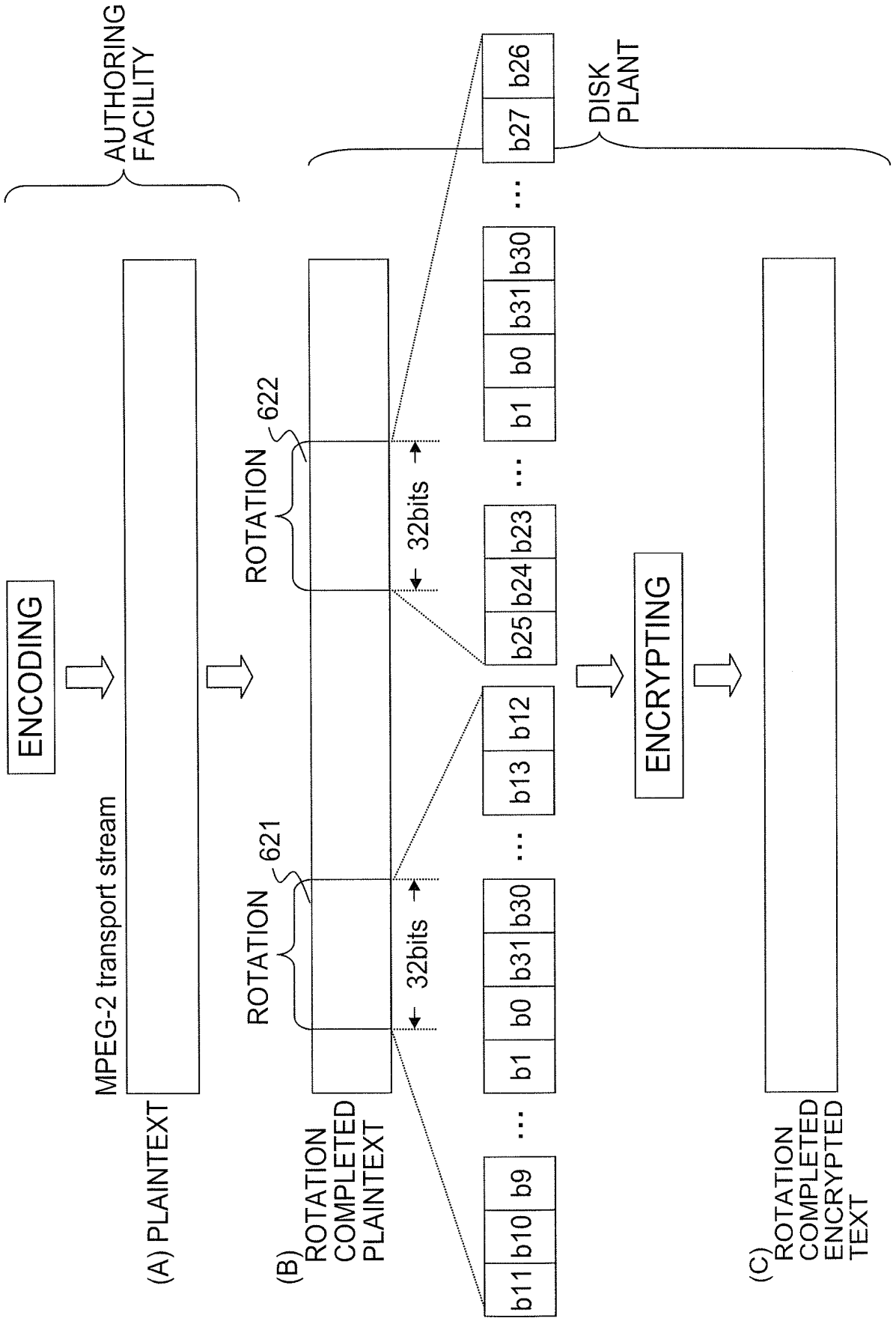
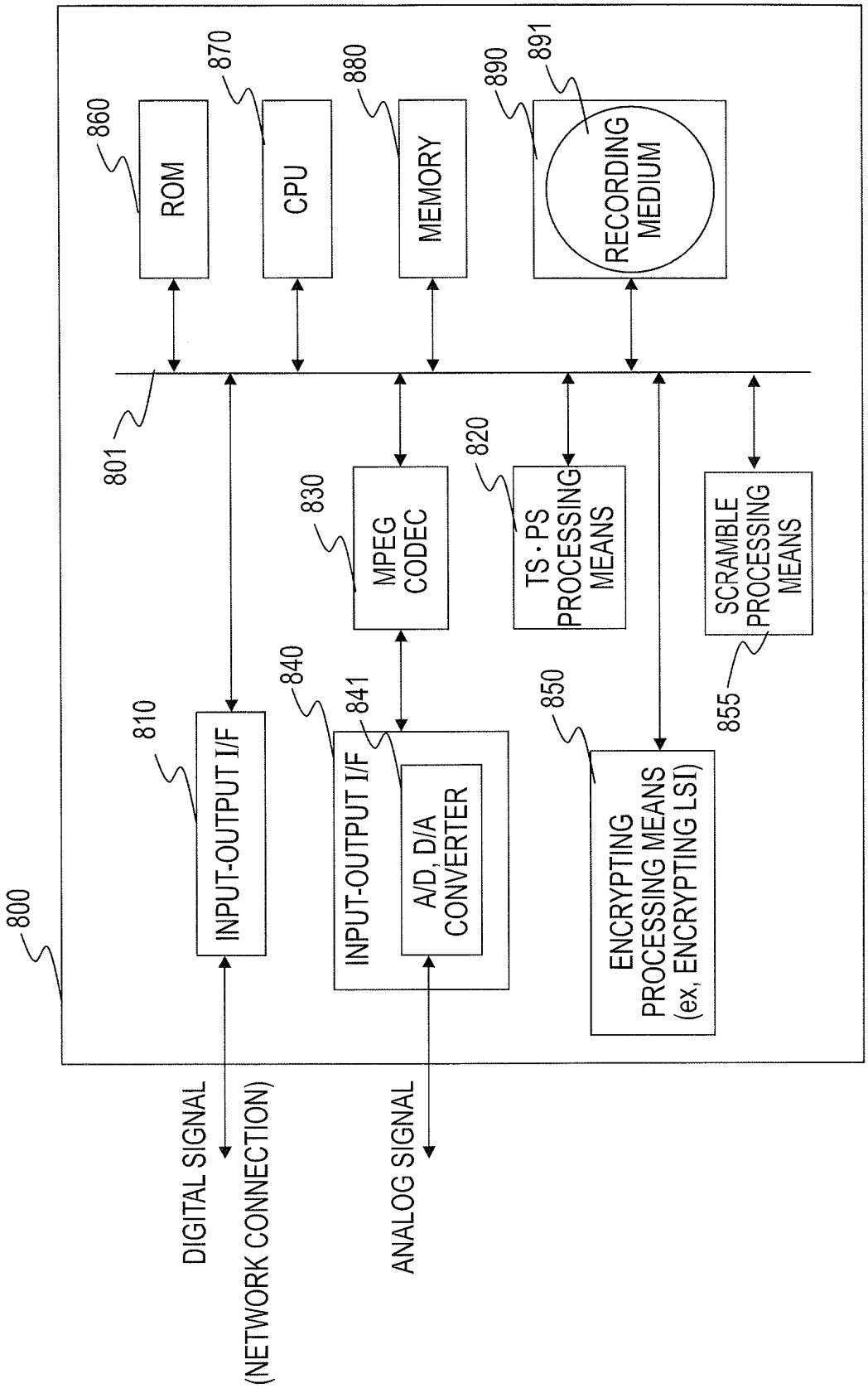

AUTHORING FACILITY
DISK PLANT
ENCODING
MPEG-2 transport stream
(A) PLAINTEXT
ROTATION
622
ROTATION
621
32bits
32bits
(B) ROTATION COMPLETED PLAINTEXT
b11 b10 b9 ... b1 b0 b31 b30 b13 b12 b25 b24 b23 ... b1 b0 b31 b30 ... b27 b26
ENCRYPTING
(C) ROTATION COMPLETED ENCRYPTED TEXT

FIG. 30


800
801
810
INPUT-OUTPUT I/F
840
841
INPUT-OUTPUT I/F
A/D, D/A CONVERTER
850
ENCRYPTING PROCESSING MEANS (ex, ENCRYPTING LSI)
855
SCRAMBLE PROCESSING MEANS
820
TS・PS PROCESSING MEANS
830
MPEG CODEC
860
ROM
870
CPU
880
MEMORY
890
891
RECORDING MEDIUM
DIGITAL SIGNAL
(NETWORK CONNECTION)
ANALOG SIGNAL